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10/658,639	09/09/2003	Han-Lim Lee	5000-1-433	4713

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EXAMINER	
LIU, LI	

ART UNIT	PAPER NUMBER
2613	

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Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No.	Applicant(s)	
	10/658,639	LEE ET AL.	
	Examiner	Art Unit	
	Li Liu	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 September, 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *07/15/2005*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on July 15, 2005 is being considered by the examiner.

Specification

2. The disclosure is objected to because of the following informalities: page 7, line 16, the "**Z**-cut" should be the "**X**-cut".

Appropriate correction is required.

Claim Objections

3. Claims 5, 19 and 20 are objected to because of the following informalities:

(1) In claim 5, line 4 and line 7-8, "pair of second **modulators**" should be changed to "pair of second **amplifiers**". It has been treated as such for the remainder of this Office action;

(2) In claim 19, line 4 and line 7-8, "pair of second **modulators**" should be changed to "pair of second **amplifiers**". It has been treated as such for the remainder of this Office action.

(3) In claim 20, the limitation "wherein the **NRZ optical signal generating section in step (b)** is adapted for receiving the NRZ electrical signal from a pulse pattern generator without using a precoder for encoding and without the NRZ optical signal generator using low pass electrical filters to receive the NRZ electrical signal" is

recited. It is well know that the NRZ generator works normally without using a precoder for encoding and without using low pass electrical filters to receive the NRZ electrical signal. It is believed that the claim 20 was intended to recite “wherein the **duobinary optical signal generating section in step (c)** is adapted for ...” (ref. FIG. 7) and has been treated as such for the remainder of this Office action.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-4, 6, 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyamoto et al (US US 6,865,348) in view of Yano (US 2003/0147656).

1). With regard to claims 1, 3 and 6, Miyamoto et al discloses a duobinary optical transmission apparatus (Figure 23B) comprising:

a light source (175 in Figure 23B) for outputting an optical carrier;

an optical signal generating section (110 in Figure 23B, column 12 line 46-47 and column 25 line 48-65) for receiving an NRZ electrical signal (5 in Figure 2A), and for modulating the optical carrier from the light source into a CS-RZ optical signal according to said NRZ electrical signal; and

a duobinary optical signal generating section (170 in Figure 23A and Figure 23B for receiving said NRZ electrical signal and modulating said NRZ optical signal into a duobinary optical signal (column 25, line 48-61).

But, Miyamoto et al does not disclose that the optical signal generating section is a "Non-Return to Zero (NRZ) optical signal generating section" which comprises a pair of first modulator driving amplifiers for amplifying and outputting the NRZ electrical signal, and a first interferometer type optical intensity modulator for modulating an intensity of said optical carrier according to driving signals inputted from said pair of first modulator driving amplifiers.

However, it is well known in the art that the pulse generating section (110 in Figure 23B) can be easily converted to NRZ pulse generator just by changing the driving source or/and the bias point, driving voltage and frequency. Mach-Zehnder NRZ pulse generator is widely used in the optical communication; Yano discloses such NRZ generator (131 in Figure 13, [0029] and [0032]). And Yano teaches wherein the NRZ optical signal generating section is adapted for receiving the NRZ electrical signal from a pulse pattern generator (NRZ DATA in Figure 13), and a pair of first modulator driving amplifiers (one above the MZ modulator 133, another under the MZ modulator) for amplifying and outputting the NRZ electrical signal, and a first interferometer type optical intensity modulator (the MZ modulator 133) for modulating an intensity of said optical carrier (LIGHT SOURCE) according to driving signals inputted from said pair of first modulator driving amplifiers.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the NRZ pulse generator taught by Yano et al to the system of Miyamoto et al so that a narrow spectral NRZ duobinary optical signal can be obtained.

2). With regard to claim 2, Miyamoto et al in view of Yano disclose all of the subject matter as applied to claim 1 above, and Miyamoto et al further discloses wherein the light source comprises a laser diode (column 12 line 49-50, 42 in Figure 2A).

3). With regard to claim 4, Miyamoto et al in view of Yano disclose all of the subject matter as applied to claims 1 and 3 above, and Miyamoto et al further discloses wherein said first interferometer type optical intensity modulator comprises a Mach-Zehnder interference type optical phase modulator (Mach-Zehnder (MZ) modulator, column 25 line 48-61).

4). With regard to claims 15 and 17, Miyamoto et al discloses a method for duobinary optical transmission comprising the steps of:

(a) outputting a light source as an optical carrier (175 in Figure 23B, column 25 line 48-61);

(b) receiving an electrical signal, and modulating the optical carrier from the light source into an optical signal according to said electrical signal by providing a optical signal generating section (110 in Figure 23B, column 25 line 48-61); and

(c) receiving NRZ electrical signal (the BINARY SIGNAL in Figure 23B) and modulating optical signal into a duobinary optical signal by a duobinary optical signal generating section (170 in Figure 23B, column 25 line 48-61).

But in step (b), Miyamoto et al disclose a RZ generating section. Miyamoto et al does not disclose a NRZ optical modulating section receiving an NRZ electrical signal, and modulating the optical carrier from the light source into an NRZ optical signal according to said NRZ electrical signal by providing a Non-Return to Zero (NRZ) optical signal generating section; and a pair of first modulator driving amplifiers for amplifying and outputting the NRZ electrical signal, and a first interferometer type optical intensity modulator for modulating an intensity of said optical carrier according to driving signals inputted from said pair of first modulator driving amplifiers.

However, it is well known in the art that the pulse generating section (110 in Figure 23B) can be easily converted to NRZ pulse generator just by changing the driving source or/and the bias point, driving voltage and frequency. Mach-Zehnder NRZ pulse generator is widely used in the optical communication; Yano discloses such NRZ generator (131 in Figure 13, 900280, [0029] and [0032]). Yano teaches that the NRZ optical signal generating section (131 in Figure 13) comprises a pair of first modulator driving amplifiers (two amplifiers associated with the modulator 133 at block 131 in Figure 13) for amplifying and outputting the NRZ electrical signal, and a first interferometer type optical intensity modulator (the MZ modulator 133) for modulating an intensity of said optical carrier (LIGHT SOURCE) according to driving signals inputted from said pair of first modulator driving amplifiers.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the NRZ pulse generator taught by Yano et al to the system of Miyamoto et al so that a narrow spectral NRZ duobinary optical signal can be obtained.

5). With regard to claim 16, Miyamoto et al in view of Yano disclose all of the subject matter as applied to claim 15 above, and Miyamoto et al further discloses wherein the light source used in step (a) comprises a laser diode (column 12 line 49-50, LD 42 in Figure 2A).

6). With regard to claim 18, Miyamoto et al in view of Yano disclose all of the subject matter as applied to claims 15 and 17 above, and Miyamoto et al further discloses wherein said first interferometer type optical intensity modulator comprises a Mach-Zehnder interference type optical phase modulator (Mach-Zehnder (MZ) modulator, column 25 line 48-61).

6. Claims 5, 7, 8, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyamoto et al (US US 6,865,348) and Yano (US 2003/0147656) as applied to claims 1, 6 and 15 above, and in further view of Kaiser et al (Kaiser et al, "Reduced Complexity Optical Duobinary 10-Gb/s Transmitter Setup Resulting in an Increased Transmission Distance", IEEE *Photonics Technology Letters, Vol. 13, No. 8, August 2001, pages 884-886*) and Kim et al. (H. Kim et al., "Demonstration of Optical Duobinary Transmission System Using Phase Modulator and Optical Filter", IEEE Photonics Technology Letters, Vol. 14, No. 7, July 2002).

1). With regard to claims 5, 7 and 8, Miyamoto et al and Yano discloses all of the subject matter as applied to claims 1 and 6 above. But Miyamoto et al in view of Yano fail to teach (A) wherein the duobinary optical generating section 200 comprises a T-flip-flop for separating by odd or even positions a group of bits in the inputted NRZ electrical signal; (B) a pair of second amplifiers for amplifying and outputting the signal from the T flip-flop; (C) a second interference type optical phase modulator for modulating a phase of said NRZ optical signal according to driving signals from said pair of second amplifiers; (D) wherein said apparatus does not require a precoder for encoding the NRZ electrical signal received from the pulse pattern generator; and (E) wherein the apparatus does not require low pass electrical filters

With regard to item (A), (B) and (D), Kaiser et al, in the same field of endeavor, teaches that the duobinary optical generating section (Figure 4) comprises a T-flip-flop (Figure 2, page 884, right column, second paragraph under III Simple Duobinary Precoder) for separating by odd or even positions a group of bits in the inputted NRZ electrical signal, and the duobinary transmitter does not require a precoder generator (Figure 2 and 3, and page 884 right column: II. Simple Duobinary Precoder) for encoding the NRZ electrical signal received from the pulse pattern generator; and a pair of second amplifiers (the top panel in Figure 4) for amplifying and outputting the signal from the T flip-flop, and a second interference type modulator (the MZ Modulator in Figure 4) for modulating said NRZ optical signal according to driving signals from said pair of second amplifiers; and

Kaiser et al discloses that by a toggle flip-flop (T-FF), no external feedback is required since the recurson is an integral functionl of the T-FF, and this precoder structure using only feed forward building blocks avoids all problems with implementation and adjustment. Besides, and upgrade to higher bit rates of a single-chip integration can be done straightforwardly.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the T-FF taught by Kaiser et al to the system of Miyamoto et al in view of Yano so that a simple structure precoder without feedback tap can be obtained, and a upgrade to higher bit rates of a single-chip integration can be made easier.

With regard to items (C) and (E), Miyamoto et al and Yano and Kaiser et al do not expressly disclose that the second interference type modulator is an **optical phase modulator**, without low pass electrical filters, for modulating a phase of said NRZ optical signal.

However, Kim et al, in the same field of endeavor, disclose an optical duobinary transmission system in which an optical phase modulator without a low pass electrical filter (phase mod in Figure 1, INTRODUCTION) has been used for generate duobinary signal.

As disclosed by Kim et al, the conventional duobinary generator has some drawback: the system performance greatly depend on the word length since the three-level signal can experience distortions depending on the imperfect response of the Low Pass Filter (LPF) etc. The optical phase modulator with an optical band pass filter will

overcome the problems associated with world lengths. Then the LPF such as the one disclosed in Miyamoto et al (67 in Figure 2A) can be eliminated. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the optical phase modulator without the LPF taught by Kim et al to the system of Miyamoto et al and Yano in view of Kaiser et al so that the problems associated with the word length can be overcome, the spectra of the optical signal is limited, the dispersion tolerance can be increased, and the interference between different channels as well as the nonlinear interaction can be reduced, and the system performance can be improved.

2). With regard to claims 19 and 20, Miyamoto et al and Yano discloses all of the subject matter as applied to claim 15 above. And Miyamoto et al in view of Yano further discloses a interference type optical modulator (174 in Figure 23B) for modulating a optical signal (the output from the MZ 111) according to driving signals from a pair of second modulators (173-1 and 173-2 in Figure 23B).

But Miyamoto et al in view of Yano fail to teach that (A) the duobinary optical generating section used in step '(c)' comprises a T-flip-flop for separating by odd or even positions a group of bits in the inputted NRZ electrical signal; (B) a pair of second amplifiers for amplifying and outputting the signal from the T flip-flop; (C) a second interference type **optical phase modulator** for modulating a phase of said NRZ optical signal according to driving signals from said pair of second amplifiers; and (D) the duobinary signal generating section in step '(c)' is adapted for receiving the NRZ

electrical signal from a pulse pattern generator without using **a precoder for encoding**; and (E) without using **low pass electrical filters** to receive the NRZ electrical signal.

With regard to items (A), (B) and (D), Kaiser et al, in the same field of endeavor, teaches that the duobinary optical generating section (Figure 4) comprises a T-flip-flop (Figure 2, page 884, right column, second paragraph under III Simple Duobinary Precoder) for separating by odd or even positions a group of bits in the inputted NRZ electrical signal, and the duobinary transmitter does not require a precoder generator (Figure 2 and 3, and page 884 right column: II. Simple Duobinary Precoder) for encoding the NRZ electrical signal received from the pulse pattern generator; and a pair of second amplifiers (the top panel in Figure 4) for amplifying and outputting the signal from the T flip-flop, and a second interference type modulator (the MZ Modulator in Figure 4) for modulating said NRZ optical signal according to driving signals from said pair of second amplifiers; and

Kaiser et al discloses that by a toggle flip-flop (T-FF), no external feedback is required since the recursion is an integral function of the T-FF, and this precoder structure using only feed forward building blocks avoids all problems with implementation and adjustment. Besides, and upgrade to higher bit rates of a single-chip integration can be done straightforwardly (page 884 right column: II. Simple Duobinary Precoder).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the T-FF taught by Kaiser et al to the system of Miyamoto et al in view of Yano so that a simple structure precoder without feedback tap

can be obtained, and a upgrade to higher bit rates of a single-chip integration can be made easier.

With regard to items (C) and (E), Miyamoto et al and Yano and Kaiser et al do not expressly disclose that the second interference type modulator is an **optical phase modulator** for modulating a phase of said NRZ optical signal, and the duobinary signal generating section for receiving the NRZ electrical signal without the **low pass electrical filters**.

However, Kim et al, in the same field of endeavor, disclose an optical duobinary transmission system in which an optical phase modulator without a low pass electrical filter (phase mod in Figure 1, INTRODUCTION) have been used for generate duobinary signal.

As disclosed by Kim et al, the conventional duobinary generator has some drawback: the system performance greatly depend on the word length since the three-level signal can experience distortions depending on the imperfect response of the Low Pass Filter (LPF) etc. The optical phase modulator with an optical band pass filter will overcome the problems associated with world lengths. Then the LPF such as the one disclosed in Miyamoto et al (67 in Figure 2A) can be eliminated.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the optical phase modulator without the LPF taught by Kim et al to the system of Miyamoto et al and Yano and Kaiser et al so that the problems associated with the word length can be overcome, the spectra of the optical signal is limited, the dispersion tolerance can be increased, and the interference

between different channels as well as the nonlinear interaction can be reduced, and the system performance can be improved.

7. Claims 9-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaiser et al (Kaiser et al, "Reduced Complexity Optical Duobinary 10-Gb/s Transmitter Setup Resulting in an Increased Transmission Distance", IEEE *Photonics Technology Letters, Vol. 13, No. 8, August 2001, pages 884-886*) in view of Yano (US 2003/0147656) in view of Yano (US 2003/0147656) and Kim et al. (H. Kim et al., "Demonstration of Optical Duobinary Transmission System Using Phase Modulator and Optical Filter", IEEE Photonics Technology Letters, Vol. 14, No. 7, July 2002).

1). With regard to claims 9 and 14, Kaiser et al discloses a duabinary optical transmission apparatus comprising:

a light source (the laser diode in Figure 4) for outputting an optical carrier;

a T-flip-flop (Figure 2, and page 884 right column: II. Simple Duobinary Precoder) separating a group of `1` in odd positions or even positions in the sequence from the NRZ electrical signal;

a second modulator driving amplifier unit (the amplifier in Figure 4) for amplifying and outputting at least one signal outputted from the T-flip-flop; and

an optical modulator (the modulator in Figure 4) for modulating the optical signal according to at least one driving signal transmitted from the second modulator driving amplifier unit.

However, Kaiser et al does not expressly discloses a NRZ generating section which has (A) a first modulator driving amplifier unit for receiving, amplifying, and then

outputting at least one NRZ electrical signal; (B) an optical intensity modulator for modulating the intensity of the optical carrier according to a driving signal inputted from the first modulator driving amplifier unit. And Kaiser also does not expressly disclose (C) the modulator in duobainary section is an **optical phase modulator** for modulating a phase of said NRZ optical signal; and (D) wherein the group of `1` in odd positions in the sequence and the group of `1` in even positions in the sequence, which have been separated from the NRZ electrical signal, respectively, have a phase difference of `$\pi$` with respect to each other.

With regard to items (A) and (B), it is well known in the art that the Mach-Zehnder NRZ pulse generator can be used with many other modulators such as the RZ, CS-RZ and duobinary generators etc. Yano discloses such NRZ generator (131 in Figure 13, [0029] and [0032], which is used with a CS-RZ 132) with a first modulator driving amplifier unit (the amplifier in Figure 13) for receiving, amplifying, and then outputting at least one NRZ electrical signal (NRZ DATA) and an optical intensity modulator (the 133 in Figure 13) for modulating the intensity of the optical carrier according to a driving signal inputted from the first modulator driving amplifier unit.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the NRZ pulse generator taught by Yano et al to the system of Kaiser et al so that a narrow spectral NRZ duobinary optical signal can be obtained.

With regard to item (C) and (D), Kaiser et al in view of Yano do not expressly disclose that the MZ optical modulator is an **optical phase modulator** for modulating a

phase of the NRZ optical signal, and the group of `1` in odd positions in the sequence and the group of `1` in even positions have a phase difference of `$\pi$` with respect to each other.

However, Kim et al, in the same field of endeavor, disclose an optical duobinary transmission system in which an optical phase modulator without a low pass electrical filter (phase mod in Figure 1, INTRODUCTION) have been used for generate duobinary signal.

As disclosed by Kim et al, the conventional duobinary generator has some drawback: the system performance greatly depend on the word length since the three-level signal can experience distortions depending on the imperfect response of the Low Pass Filter (LPF) etc. The optical phase modulator with an optical band pass filter will overcome the problems associated with world lengths. Then the LPF such as the one disclosed in Miyamoto et al (67 in Figure 2A) can be eliminated. As disclosed by Kim et al (Figure 3 and 4), the narrow spectral width is the most important feature of the duobinary signal in achieving high-spectral-efficient and large dispersion tolerance DWDM systems.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the optical phase modulator taught by Kim et al to the system of Kaiser et al and Yano so that the system performance can be improved, the spectra of the optical signal is limited, the dispersion tolerance can be increased, and the interference between different channels as well as the nonlinear interaction can be reduced. With the T-FF and the phase modulator, the group of `1` in odd positions in

the sequence and the group of `1` in even positions can be made to have a phase difference of `$\pi$` with respect to each other.

2). With regard to claim 10, Kaiser et al in view of Yano and Kim discloses disclose all of the subject matter as applied to claim 9 above, and Kaiser et al and Yano further discloses wherein each of the optical intensity modulator and the optical phase modulator comprises a Mach-Zehnder interferometer type optical modulator (the Mach-Zehnder modulators are used in Kaiser and Yano's systems).

3). With regard to claim 11, Kaiser et al in view of Yano and Kim disclose all of the subject matter as applied to claims 9 and 10 above, and Kaiser et al and Yano further discloses wherein the Mach-Zehnder interferometer type optical modulator is a dual-armed Z-cut Mach-Zehnder interferometer type optical modulator (duo-arm MZM, top in Figure 4).

4). With regard to claim 12, Kaiser et al in view of Yano and Kim discloses disclose all of the subject matter as applied to claims 9-11 above. And Kaiser et al in view of Yano further discloses wherein each of the first and second modulator driving amplifier units includes a pair of modulator driving amplifiers, each of which amplifies the NRZ electrical signal inputted to itself (the two amplifiers associated with the dual-arm MZM, top in Figure 4 of Kaiser, or 131 in Figure 13 of Yano).

5). With regard to claim 13, Kaiser et al in view of Yano and Kim disclose all of the subject matter as applied to claims 9 and 10 above, and Kaiser et al further discloses wherein the Mach-Zehnder interferometer type optical modulator is a single-

armed X-cut Mach-Zehnder interferometer type optical modulator (single-arm MZM, bottom in Figure 4).

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Bissessur et al (US 2002/0057478) discloses a duobinary transmitter using a MZ modulator and an optical filter, and the optimum filter bandwidth is studied.

Wei et al (US 2002/0196508) discloses an optical signal with a phase modulator and a T-FF precoder.

Ikeuchi (US 2003/0185575) discloses an drive control apparatus and method for optical modulator with a T-FF.

Royset et al disclose a novel dispersion tolerant optical duobinary transmitter using phase modulator and Bragg grating filter (ECOC'98, September 20-24 1998, page 225-226, Madrid, Spain).

Winzer et al disclose a system with a phase modulator which can generate a DCS-RZ. (IEEE Photonics Technology Letters, Vol. 13, No. 12 December 2001, page 1298-1300).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Li Liu whose telephone number is (571)270-1084. The examiner can normally be reached on Mon-Fri, 8:00 am - 5:30 pm, alternating Fri off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Li Liu
September 26, 2006

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER